CLAIMS

What is claimed is:

1   1. A method comprising selecting a transmit power level and subcarrier
2   modulation assignments based on measured channel conditions to achieve a
3   performance level for communications over a symbol-modulated subcarrier
4   communication channel.

1   2. The method of claim 1 further comprising:
2   determining at least one of a desired packet error rate and a desired link
3   data rate based on the performance level desired for an application and a data type;
4   and
5   determining whether to change the transmit power level depending on
6   whether the at least one of the desired packet error rate and the desired link data
7   rate can be achieved based on the selected subcarrier modulation assignments and
8   the selected transmit power level.

1   3. The method of claim 2 further comprising generating at least one of an
2   estimated packet error rate and an estimated link data rate for the channel based on
3   the selected subcarrier modulation assignments and the selected transmit power
4   level, and
5   wherein the determining whether to change the transmit power level is
6   based on a comparison between the at least one of the estimated packet error rate
7   and link data rate, and the at least one of the desired packet error rate and the
8   desired link data rate.

1   4. The method of claim 2, wherein the determining the at least one of the
2   desired packet error rate and the desired link data rate is based on whether the data
3   type comprises voice, audio, video, gaming, internet protocol, file transfer or
4   email data.

1   5. The method of claim 4 wherein the determining the at least one of the

2 desired packet error rate and the desired link data rate further comprises

3 determining the desired packet error rate and the desired link data rate based on a

4 desired quality of service level for the application using data of the data type.

1   6. The method of claim 2 further comprising:

2   decreasing the transmit power level to less than a maximum power level

3 for an application that meets a predetermined quality of service level with data

4 having at least one of a low desired data rate or a high permitted packet error rate;

5 and

6   communicating at the decreased transmit power level at either a lowered

7 link data rate selected to substantially achieve the desired packet error rate, or at

8 an increased packet error rate selected to substantially achieve the desired link

9 data rate.

1   7. The method of claim 2 further comprising:

2   measuring channel conditions of at least one other communication

3 channel; and

4   refraining from increasing the transmit power level when an increased

5 transmit power level would cause an unacceptable level of interference with other

6 communication devices based on the measured channel conditions of the at least

7 one other communication channel.

1   8. The method of claim 2 further comprising increasing the transmit power

2 level to achieve at least one of a decreased the packet error rate or an increased the

3 link data rate to substantially meet a quality of service level for the application and

4 the data type.

1   9. The method of claim 2 further comprising:

2   refraining from increasing the transmit power level; and

3   either communicating at a lowered link data rate selected to substantially

4 achieve the desired packet error rate, or communicating at a reduced packet error

5 rate selected to substantially achieve the desired link data rate.

1   10. The method of claim 1 wherein the communication channel comprises
2 a plurality of individual symbol-modulated subcarriers, and wherein the selecting
3 comprises selecting modulation rates for the individual subcarriers based on the
4 measured channel conditions.

1   11. The method of claim 10 wherein the selecting the subcarrier
2 modulation assignments comprises selecting one of no modulation, BPSK
3 modulation, QPSK modulation, 8-PSK modulation, 16-QAM, 32-QAM, 64-
4 QAM, 128-QAM and 256-QAM for the individual subcarriers of the
5 communication channel.

1   12. The method of claim 10 wherein the selecting the subcarrier
2 modulation assignments comprises selecting the subcarrier modulation
3 assignments for the individual subcarriers based on a received signal, and
4   wherein the method further comprises receiving data packets comprising
5 data and training symbols modulated in accordance with the selected subcarrier
6 modulation assignments over the plurality of subcarriers, the data packets
7 transmitted at the selected transmit power level.

1   13. The method of claim 3 wherein the selecting the subcarrier modulation
2 assignments and the generating the at least one of the estimated packet error rate
3 and the estimated link data rate are performed by a receiving station, and
4   wherein the method further comprises requesting, by the receiving station,
5 a transmitting station to change the transmit power level based on the desired
6 packet error rate and the desired link data rate.

1   14. The method of claim 13 further comprising:
2   refraining, at the transmitting station, from increasing the transmit power
3 level based on at least one of either network considerations, interference
4 considerations or power consumption considerations;
5   reselecting the subcarrier modulation assignments to achieve a quality of
6 service level; and

7   communicating the re-selected selecting subcarrier modulation

8   assignments to the receiving station.

1   15. A method comprising:

2   receiving a communication signal transmitted at a predetermined transmit

3   power level carrying packets in a burst of predetermined size;

4   evaluating based on characteristics of the received communication signal

5   for various packet error rates, various subcarrier modulation assignments and

6   fragment sizes to determine potential link data rates; and

7   selecting one of the subcarrier modulation assignments and fragment sizes

8   based on the potential link data rate to achieve a desired link data rate.

1   16. The method of claim 15 wherein:

2   the receiving the communication signal comprises receiving the

3   communication signal transmitted at the predetermined transmit power level

4   carrying packets having one of either a requested or a predetermined burst size;

5   and

6   the evaluating comprises evaluating the various subcarrier modulation

7   assignments and fragment sizes based on measured conditions of a

8   communication channel through which the communication signal is received.

1   17. The method of claim 15 wherein:

2   the evaluating further comprises estimating a duration of a data burst and a

3   number of bytes expected to be received without error to determine an estimated

4   link data rate, and

5   wherein the selecting further comprises selecting a combination of packet

6   error rate and fragment size to achieve a highest link data rate.

1   18. The method of claim 15 further comprising:

2   transmitting the selected subcarrier modulation assignments, the selected

3   fragment size and an expected packet error rate to a transmitting station; and

4   receiving subsequent communications from the transmitting station in

5   accordance with the selections.

1   19. The method of claim 15 wherein the communication signal is received
2 through a communication channel comprising a plurality of individual symbol-
3 modulated subcarriers, and wherein the selecting comprises selecting modulation
4 rates for the individual subcarriers based on the measured conditions of the
5 communication channel.

1   20. The method of claim 19 wherein the selecting the subcarrier
2 modulation assignments comprises selecting at least one of no modulation, BPSK
3 modulation, QPSK modulation, 8-PSK modulation, 16-QAM, 32-QAM, 64-
4 QAM, 128-QAM and 256-QAM for the individual subcarriers of the
5 communication channel,
6   wherein individual subcarriers having a better channel response are
7 assigned higher-order modulation assignments having more bits per symbol, and
8   wherein subcarriers having a worse channel response are assigned lower-
9 order modulation assignments having less bits per symbol.

1   21. An apparatus comprising:
2   an application controller to determine a desired performance level for an
3 application and data type; and
4   a physical layer to select a transmit power level and subcarrier modulation
5 assignments for receipt of data over a communication channel at the desired
6 performance level.

1   22. The apparatus of claim 21 further comprising a network controller to
2 determine a desired packet error rate and a link data rate based on the desired
3 performance, wherein the network controller is to further determine whether to
4 change the transmit power level for subsequent communications over the
5 communication channel depending on whether the desired packet error rate and
6 link data rate can be achieved based on the selected subcarrier modulation
7 assignments and the selected transmit power level.

1   23. The apparatus of claim 22 wherein the network controller is to estimate

2   a packet error rate and a link data rate for the channel based on the selected

3   subcarrier modulation assignments and the selected transmit power level,

4   wherein network controller is to further determine whether to change the

5   transmit power level is based on a difference between the estimated packet error

6   rate and link data rate, and the desired packet error rate or desired link data rate,

7   and

8   wherein the network controller is to further determine the desired packet

9   error rate and the desired link data rate based on whether the data type comprises

10 one of either voice, audio, video, gaming, internet protocol, file transfer or email

11 data.

1   24. The apparatus of claim 23 wherein the communication channel

2   comprises a plurality of individual symbol-modulated subcarriers, and wherein the

3   network controller is to select modulation rates for the individual subcarriers

4   based on the measured channel conditions, and

5   wherein the subcarrier modulation assignments comprise either no

6   modulation, BPSK modulation, QPSK modulation, 8-PSK modulation, 16-QAM,

7   32-QAM, 64-QAM, 128-QAM and 256-QAM for the individual subcarriers of the

8   communication channel.

1   25. A system comprising:

2   a omnidirectional antenna to receive communications over a symbol-

3   modulated subcarrier communication channel;

4   a physical layer coupled with the antenna to select a transmit power level

5   and subcarrier modulation assignments based on channel conditions to achieve a

6   performance level; and

7   an application controller to determine the performance level based on an

8   application and data type.

1   26. The system of claim 25 further comprising a network controller to

2   determine at least one of a desired packet error rate and a desired link data rate

3   based on the performance level desired for the application and the data type,

4 wherein the network controller is to further determine whether to change

5 the transmit power level for subsequent communications over the communication

6 channel depending on whether the at least one of the desired packet error rate and

7 the desired link data rate can be achieved based on the selected subcarrier

8 modulation assignments and the selected transmit power level.

1 27. The system of claim 26 wherein:

2 the network controller is to instruct a transmitting station to decrease the

3 transmit power level to less than a maximum power level for an application that

4 meets a predetermined quality of service level with data having at least one of a

5 low data rate data or a high packet error rate, and

6 the transmitting station is to communicate at the decreased transmit power

7 level at either a lowered link data rate selected to substantially achieve the desired

8 packet error rate, or at an increased packet error rate selected to substantially

9 achieve the desired link data rate,

10 wherein the network controller is to refrain from instructing the

11 transmitting station to increase the transmit power level when an increased

12 transmit power level would cause an unacceptable level of interference with other

13 communication devices based on measured channel conditions of the at least one

14 other communication channel.

1 28. A machine-readable medium that provides instructions, which when

2 executed by one or more processors, cause said processors to perform operations

3 comprising selecting a transmit power level and subcarrier modulation

4 assignments based on measured channel conditions to achieve a performance level

5 for communications over a symbol-modulated subcarrier communication channel.

1 29. The machine-readable medium of claim 28 wherein the instructions,

2 when further executed by the processors, cause the processors to perform

3 operations further comprising:

4 determining at least one of a desired packet error rate and a desired link

5 data rate based on the performance level desired for an application and a data type;

6   determining whether to change the transmit power level depending on

7   whether the at least one of the desired packet error rate and the desired link data

8   rate can be achieved based on the selected subcarrier modulation assignments and

9   the selected transmit power level;

10   generating at least one of an estimated packet error rate and an estimated

11   link data rate for the channel based on the selected subcarrier modulation

12   assignments and the selected transmit power level,

13   wherein the determining whether to change the transmit power level is

14   based on a comparison between the at least one of the estimated packet error rate

15   and link data rate, and the at least one of the desired packet error rate and the

16   desired link data rate,

17   wherein the determining the at least one of the desired packet error rate

18   and the desired link data rate is based on whether the data type comprises voice,

19   audio, video, gaming, internet protocol, file transfer or email data, and

20   wherein the determining the at least one of the desired packet error rate

21   and the desired link data rate further comprises determining the desired packet

22   error rate and the desired link data rate based on a desired quality of service level

23   for the application using data of the data type.

1   30. The machine-readable medium of claim 29 wherein the

2   communication channel comprises a plurality of individual symbol-modulated

3   subcarriers, and wherein the selecting comprises selecting modulation rates for the

4   individual subcarriers based on the measured channel conditions, and

5   wherein the selecting the subcarrier modulation assignments comprises

6   selecting one of no modulation, BPSK modulation, QPSK modulation, 8-PSK

7   modulation, 16-QAM, 32-QAM, 64-QAM, 128-QAM and 256-QAM for the

8   individual subcarriers of the communication channel.